08CN6021-9
(GP2-0180-P)

CLAIM LISTING

1. (original) A curable composition, comprising:

a capped poly(arylene ether) resin prepared by capping a blend of a first poly(arylene ether) resin and a second poly(arylene ether) resin, wherein the first poly(arylene ether) resin and the second poly(arylene ether) resin have intrinsic viscosities differing by at least 0.1 deciliters per gram, measured at 25°C in chloroform;

an alkenyl aromatic monomer; and

an acryloyl monomer.

2. (original) The curable composition of claim 1, wherein the capped poly(arylene ether) resin has an intrinsic viscosity of about 0.15 to about 0.45 deciliters per gram.

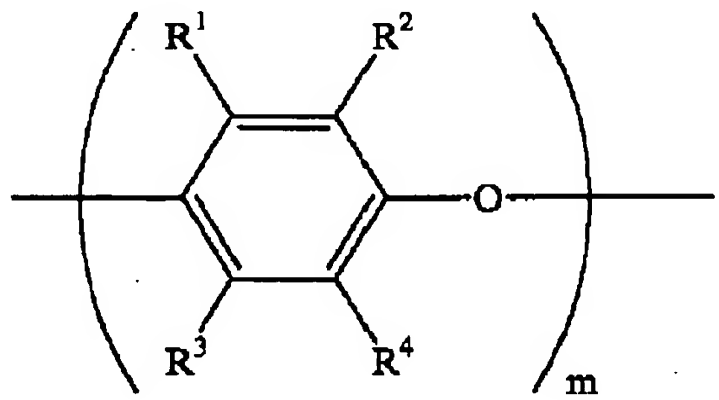
3. (original) The curable composition of claim 1, wherein the first poly(arylene ether) resin has an intrinsic viscosity of about 0.05 to less than 0.20 deciliters per gram.

4. (original) The curable composition of claim 1, wherein the second poly(arylene ether) resin has an intrinsic viscosity of at least 0.20 to about 0.60 deciliters per gram.

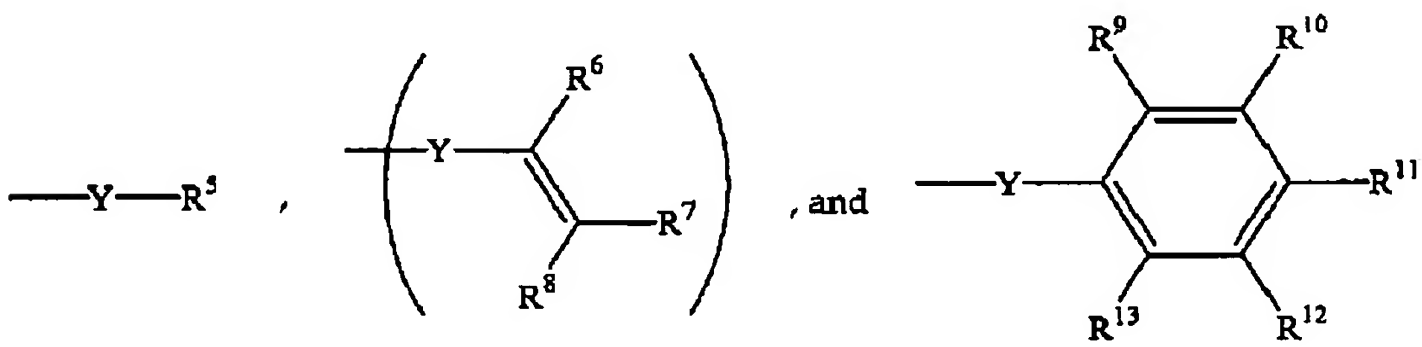
5. (original) The curable composition of claim 1, wherein the capped poly(arylene ether) resin has the structure

$$Q(J\text{-}K)_y$$

wherein Q is the residuum of a monohydric, dihydric, or polyhydric phenol; y is 1 to 100; J comprises repeating structural units having the formula



wherein R^1 and R^3 are each independently selected from the group consisting of hydrogen, halogen, primary or secondary C_1-C_{12} alkyl, C_2-C_{12} alkenyl,C_2-C_{12} alkynyl, C_1-C_{12} aminoalkyl, C_1-C_{12} hydroxyalkyl, phenyl, C_1-C_{12} haloalkyl, C_1-C_{12} hydrocarbyloxy, and C_2-C_{12} halohydrocarbyloxy wherein at least two carbon atoms separate the halogen and oxygen atoms; R^2 and R^4 are each independently selected from the group consisting of halogen, primary or secondary C_1-C_{12} alkyl, C_2-C_{12} alkenyl,C_2-C_{12} alkynyl, C_1-C_{12} aminoalkyl, C_1-C_{12} hydroxyalkyl, phenyl, C_1-C_{12} haloalkyl, C_1-C_{12} hydrocarbyloxy, and C_2-C_{12} halohydrocarbyloxy wherein at least two carbon atoms separate the halogen and oxygen atoms; m is 1 to about 200; and K is a capping group selected from



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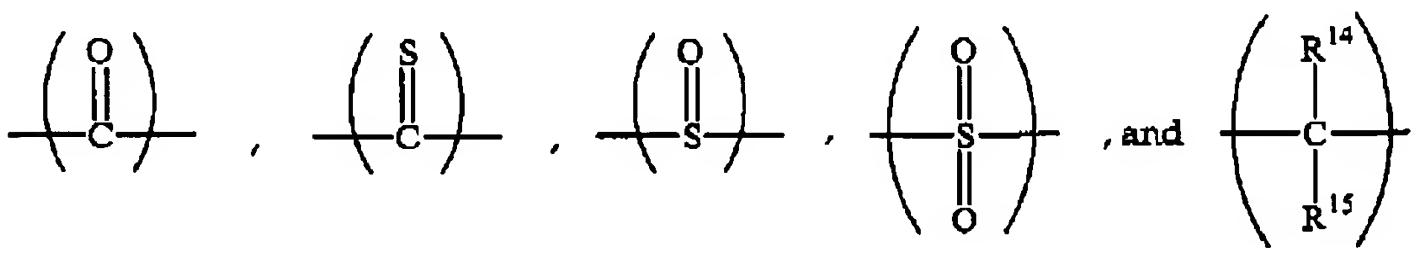
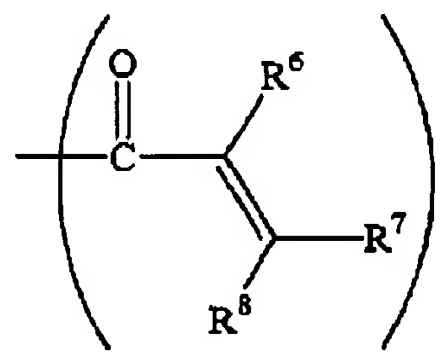
wherein R^5 is C_1-C_{12} alkyl; R^6-R^8 are each independently selected from the group consisting of hydrogen, C_1-C_{18} hydrocarbyl, C_2-C_{18} hydrocarbyloxycarbonyl, nitrile, formyl, carboxylate, imidate, and thiocarboxylate; R^9-R^{13} are each independently selected from the group consisting of hydrogen, halogen, C_1-C_{12} alkyl, hydroxy, and amino; and wherein Y is a divalent group selected from



wherein R^{14} and R^{15} are each independently selected from the group consisting of hydrogen and C_1-C_{12} alkyl.

6. (original) The curable composition of claim 5, wherein Q is the residuum of a monohydric phenol.

7. (original) The curable composition of claim 1, wherein the capped poly(arylene ether) comprises at least one capping group having the structure

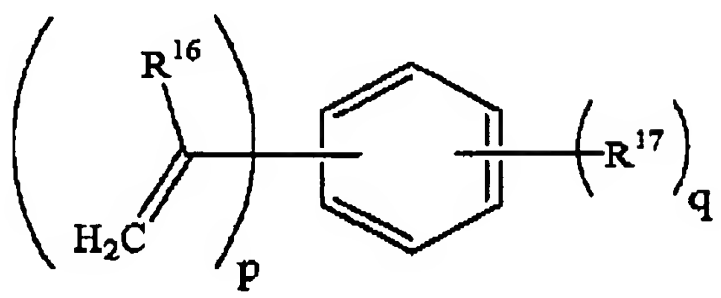


wherein R^6-R^8 are each independently selected from the group consisting of hydrogen, C_1-C_{18} hydrocarbyl, C_2-C_{12} hydrocarbyloxycarbonyl, nitrile, formyl, carboxylate, imidate, and thiocarboxylate.

8. (original) The curable composition of claim 7, wherein R^6 is hydrogen or methyl, and R^7 and R^8 are hydrogen.

9. (original) The curable composition of claim 1, comprising about 1 to about 98 parts of the capped poly(arylene ether) per 100 parts total of the capped poly(arylene ether), the alkenyl aromatic monomer, and the acryloyl monomer.

10. (original) The curable composition of claim 1, wherein the alkenyl aromatic monomer has the structure



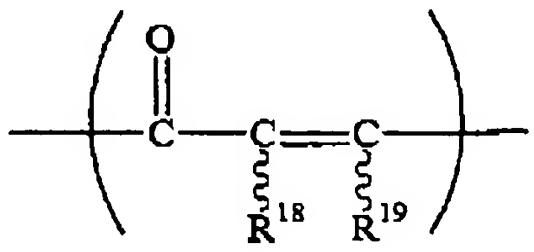
wherein each occurrence of R^{16} is independently hydrogen or C_1-C_{18} hydrocarbyl; each occurrence of R^{17} is independently halogen, C_1-C_{12} alkyl, C_1-C_{12} alkoxyl, or C_6-C_{18} aryl; p is 1 to 4; and q is 0 to 5.

11. (original) The curable composition of claim 1, wherein the alkenyl aromatic monomer is selected from styrene, α-methylstyrene, 2-methylstyrene, 3-methylstyrene, 4-methylstyrene, 2-t-butylstyrene, 3-t-butylstyrene, 4-t-butylstyrene, 1,3-divinylbenzene, 1,4-divinylbenzene, 1,3-diisopropenylbenzene, 1,4-diisopropenylbenzene, styrenes having from 1 to 5 halogen substituents on the aromatic ring, and combinations thereof.

12. (original) The curable composition of claim 1, wherein the alkenyl aromatic monomer is styrene.

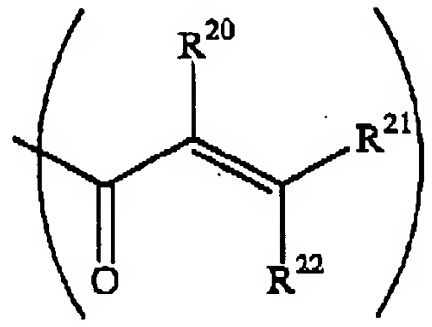
13. (original) The composition of claim 1, comprising about 1 to about 98 parts alkenyl aromatic monomer per 100 parts total of the capped poly(arylene ether), the alkenyl aromatic monomer, and the acryloyl monomer.

14. (original) The composition of claim 1, wherein the acryloyl monomer comprises at least one acryloyl moiety having the structure



wherein R^{18} and R^{19} are each independently selected from the group consisting of hydrogen and C_1-C_{12} alkyl, and wherein R^{18} and R^{19} may be disposed either cis or trans about the carbon-carbon double bond.

15. (original) The composition of claim 1, wherein the acryloyl monomer comprises at least one acryloyl moiety having the structure



wherein R^{20}-R^{22} are each independently selected from the group consisting of hydrogen, C_1-C_{12} hydrocarbyl, C_2-C_{18} hydrocarbyloxycarbonyl, nitrile, formyl, carboxylate, imidate, and thiocarboxylate.

16. (original) The composition of claim 15, wherein the acryloyl monomer comprises at least two acryloyl moieties.

17. (original) The composition of claim 15, wherein the acryloyl monomer comprises at least three acryloyl moieties.

18. (original) The composition of claim 1, wherein the acryloyl monomer is trimethylolpropane tri(meth)acrylate, 1,6-hexanediol di(meth)acrylate, neopentyl glycol di(meth)acrylate, ethylene glycol di(meth)acrylate, propylene glycol di(meth)acrylate, cyclohexanedimethanol di(meth)acrylate, butanediol di(meth)acrylate, diethylene glycol di(meth)acrylate, triethylene glycol di(meth)acrylate, isobornyl (meth)acrylate, methyl (meth)acrylate, or a mixture of at least two of the foregoing acryloyl monomers.

19. (original) The composition of claim 1, comprising about 1 to about 98 parts acryloyl monomer per 100 parts total of the capped poly(arylene ether), the alkenyl aromatic monomer, and the acryloyl monomer.

20. (original) The composition of claim 1, further comprising a curing catalyst.

21. (original) The curable composition of claim 1, further comprising about 5 to about 80 weight percent of a particulate filler, based on the total weight of the composition.

22. (original) The curable composition of claim 21, wherein the particulate filler is aluminum trihydrate.

23. (original) The curable composition of claim 1, further comprising about 2 to about 80 weight percent of a fibrous filler, based on the total weight of the composition.

24. (original) The curable composition of claim 23, wherein the fibrous filler is glass fibers.

25. (original) The curable composition of claim 1, further comprising an additive selected from dyes, pigments, colorants, conductive agents, antioxidants, heat stabilizers, light stabilizers, plasticizers, lubricants, flow modifiers, drip retardants, flame retardants, antiblocking agents, antistatic agents, flow-promoting agents, processing aids, and combinations thereof.

26. (original) The composition of claim 1, wherein the composition after molding exhibits a Dynatup total energy greater than 9 Joules, measured at 25°C according to ASTM D3763.

27. (original) The composition of claim 1, wherein the composition after molding exhibits a flexural strength greater than 10,000 pounds per square inch, measured at 25°C according to ASTM D790.

28. (original) The composition of claim 1, wherein the composition after molding exhibits a Dynatup total energy greater than 10 Joules measured at 25°C according to ASTM D3763, and a flexural strength greater than 10,000 pounds per square inch measured at 25°C according to ASTM D790.

29. (original) The composition of claim 1, wherein the composition after molding exhibits a breakdown voltage of at least 140 kilovolts, measured according to the procedure described in the specification.

30. (original) A cured composition, comprising the reaction product of:

a capped poly(arylene ether) resin prepared by capping a blend of a first poly(arylene ether) resin and a second poly(arylene ether) resin, wherein the first poly(arylene ether) resin and the second poly(arylene ether) resin have intrinsic viscosities differing by at least 0.1 deciliters per gram, measured at 25°C in chloroform;

an alkenyl aromatic monomer; and

an acryloyl monomer.

31. (original) A curable composition, comprising:

a (meth)acrylate-capped poly(arylene ether) resin prepared by capping a blend of a first poly(arylene ether) resin having an intrinsic viscosity of about 0.05 to about 0.20 deciliters per gram and a second poly(arylene ether) resin having an intrinsic viscosity of about 0.25 to about 0.40 deciliters per gram, with the proviso that the first poly(arylene ether) resin and the second poly(arylene ether) resin have intrinsic viscosities differing by at least 0.1 deciliters per gram; wherein all intrinsic viscosities are measured at 25°C in chloroform;

an alkenyl aromatic monomer selected from styrene, α-methylstyrene, 2-methylstyrene, 3-methylstyrene, 4-methylstyrene, 2-t-butylstyrene, 3-t-butylstyrene, 4-t-butylstyrene, 1,3-divinylbenzene, 1,4-divinylbenzene, 1,3-diisopropenylbenzene, 1,4-diisopropenylbenzene, styrenes having from 1 to 5 halogen substituents on the aromatic ring, and combinations thereof.; and

an acryloyl monomer selected from trimethylolpropane tri(meth)acrylate, 1,6-hexanediol di(meth)acrylate, neopenyl glycol di(meth)acrylate, ethylene glycol di(meth)acrylate, propylene glycol di(meth)acrylate, cyclohexanedimethanol di(meth)acrylate, butanediol di(meth)acrylate, diethylene glycol di(meth)acrylate, triethylene glycol di(meth)acrylate, isobornyl (meth)acrylate, methyl (meth)acrylate, and mixtures thereof.

32. (original) A cured composition, comprising the reaction product of:

a (meth)acrylate-capped poly(arylene ether) resin prepared by capping a blend of a first poly(arylene ether) resin having an intrinsic viscosity of about 0.05 to about 0.20 deciliters per gram and a second poly(arylene ether) resin having an intrinsic viscosity of about 0.25 to about 0.40 deciliters per gram, with the proviso that the first poly(arylene ether) resin and the second poly(arylene ether) resin have intrinsic viscosities differing by at least 0.1 deciliters per gram; wherein all intrinsic viscosities are measured at 25°C in chloroform;

an alkenyl aromatic monomer selected from styrene, α-methylstyrene, 2-methylstyrene, 3-methylstyrene, 4-methylstyrene, 2-t-butylstyrene, 3-t-butylstyrene, 4-t-butylstyrene, 1,3-divinylbenzene, 1,4-divinylbenzene, 1,3-diisopropenylbenzene, 1,4-diisopropenylbenzene, styrenes having from 1 to 5 halogen substituents on the aromatic ring, and combinations thereof.; and

an acryloyl monomer selected from trimethylolpropane tri(meth)acrylate, 1,6-hexanediol di(meth)acrylate, ethylene glycol di(meth)acrylate, neopenyl glycol di(meth)acrylate propylene glycol di(meth)acrylate, cyclohexanedimethanol di(meth)acrylate, butanediol di(meth)acrylate, diethylene glycol di(meth)acrylate, triethylene glycol di(meth)acrylate, isobornyl (meth)acrylate, methyl (meth)acrylate, and mixtures thereof.

33. (original) A curable composition, comprising:

about 1 to about 70 parts by weight of a (meth)acrylate-capped poly(2,6-dimethyl-1,4-phenylene ether) resin prepared by capping a blend of a first poly(2,6-dimethyl-1,4-phenylene ether) resin having an intrinsic viscosity of about 0.1 to about 0.2 deciliters per gram and a second poly(2,6-dimethyl-1,4-phenylene ether) resin having an intrinsic viscosity of about 0.25 to about 0.35 deciliters per gram, with the proviso that the first poly(2,6-dimethyl-1,4-phenylene ether) resin and the second poly(2,6-dimethyl-1,4-phenylene ether) resin have intrinsic viscosities differing by at least 0.1 deciliters per gram; wherein all intrinsic viscosities are measured at 25°C in chloroform;

about 30 to about 98 parts by weight of styrene;

about 1 to about 69 parts by weight of an acryloyl monomer selected from trimethylolpropane tri(meth)acrylate, 1,6-hexanediol di(meth)acrylate, neopenyl glycol di(meth)acrylate, and mixtures thereof;

about 5 to about 500 parts by weight of aluminum trihydrate; and

about 5 to about 500 parts by weight of glass fibers;

wherein all parts by weight are based on 100 parts by weight total of the (meth)acrylate-capped poly(2,6-dimethyl-1,4-phenylene ether) resin, styrene, and the acryloyl monomer.

34. (original) A cured composition, comprising the reaction product of:

about 1 to about 70 parts by weight of a (meth)acrylate-capped poly(2,6-dimethyl-1,4-phenylene ether) resin prepared by capping a blend of a first poly(2,6-dimethyl-1,4-phenylene ether) resin having an intrinsic viscosity of about 0.1 to about 0.2 deciliters per gram and a second poly(2,6-dimethyl-1,4-phenylene ether) resin having an intrinsic viscosity of about 0.25 to about 0.35 deciliters per gram, with the proviso that the first poly(2,6-dimethyl-1,4-phenylene ether) resin and the second poly(2,6-dimethyl-1,4-phenylene ether) resin have intrinsic viscosities differing by at least 0.1 deciliters per gram; wherein all intrinsic viscosities are measured at 25°C in chloroform;

about 30 to about 98 parts by weight of styrene;

about 1 to about 69 parts by weight of an acryloyl monomer selected from trimethylolpropane tri(meth)acrylate, 1,6-hexanediol di(meth)acrylate, cyclohexanedimethanol di(meth)acrylate, neopenyl glycol di(meth)acrylate, and mixtures thereof;

about 5 to about 500 parts by weight of aluminum trihydrate; and

about 5 to about 500 parts by weight of glass fibers;

wherein all parts by weight are based on 100 parts by weight total of the (meth)acrylate-capped poly(2,6-dimethyl-1,4-phenylene ether) resin, styrene, and the acryloyl monomer.

35. (original) An article comprising the cured composition of claims 30, 32, or 34.

36. (original) A method of preparing a capped poly(arylene ether) resin, comprising:

reacting a capping agent with a blend of a first poly(arylene ether) resin and a second poly(arylene ether) resin, wherein the first poly(arylene ether) resin and the second poly(arylene ether) resin have intrinsic viscosities differing by at least 0.1 deciliters per gram, measured at 25°C in chloroform.

37. (original) The method of claim 36, wherein the capping agent is selected from acetic anhydride, methacrylic anhydride, acrylic anhydride, salicylic anhydride, succinic anhydride, glutaric anhydride, propionic anhydride, isobutyric anhydride, maleic anhydride, adipic anhydride, phthalic anhydride, and combinations thereof.

38. (original) A capped poly(arylene ether) resin prepared according to the method of claim 36.